American Journal of Medical Quality
26(5) 387–395

DOI: 10.1177/1062860611399116
http://ajmq.sagepub.com

Variation in Public Reporting of Central Line–Associated Bloodstream Infections by State

Monica S. Aswani, MSPH,[1,2] Julie Reagan, PhD, JD, MPH,[3] Linda Jin, BS, MD,[1,4] Peter J. Pronovost, MD, PhD,[1] and Christine Goeschel, MPA, MPS, ScD, RN[1]

Abstract

Central line–associated bloodstream infections (CLABSIs) are common, costly, and largely preventable. Consumers who want high-quality care should have access to CLABSI rates to make health care decisions. The authors searched state health department Web sites for publicly available CLABSI data. Fourteen states, all with mandatory CLABSI monitoring laws, had publicly available data. The authors identified significant variation in the presentation of infection rates, methods of risk adjustment, locations and care settings reported, time span of data collection, and time lag to reporting. The wide variation in availability and content of information illustrates the need for standardized CLABSI monitoring and reporting mechanisms.

Keywords

central line–associated bloodstream infections, patient safety, public reporting, HAI legislation

Health care–associated infections (HAIs) impose a significant burden on the US health care system, accounting for 99 000 deaths and $28 to $45 billion dollars in direct costs to hospitals annually.[1,2] Central line–associated bloodstream infections (CLABSIs) are a common, costly, and often lethal type of HAI, accounting for an estimated 31 000 HAI deaths each year.[1]

Most of these deaths are preventable. In 2003, a multifaceted quality improvement program illustrated that adherence to simple and inexpensive evidence-based practices can significantly reduce the rate of CLABSIs in intensive care units (ICUs). Over an 18-month period, the mean CLABSI rate per 1000 central line days in more than 100 ICUs decreased from 7.7 to 1.4, and the median CLABSI rate per 1000 central line days decreased from 2.7 to zero.[3]

[1]Johns Hopkins University, Baltimore, MD
[2]University of Alabama at Birmingham, Birmingham, AL
[3]HAI Focus, Cedar Crest, NM
[4]Washington University, St Louis, MO

The authors declared a potential conflict of interest (eg, a financial relationship with the commercial organizations or products discussed in this article) as follows: Dr Reagan reports receiving funding as a consultant from the New Mexico Medical Review Association based on stimulus ARRA funding provided to the state of New Mexico. Dr Pronovost reports receiving grants or contract support from the Agency for Healthcare Research and Quality, the National Institutes of Health, the National Patient Safety Agency (UK), the Robert Wood Johnson Foundation, and The Commonwealth Fund for research related to measuring and improving patient safety; honoraria from various hospitals and health systems and the Leigh Speakers Bureau to speak on quality and safety; consultancy with the Association for Professionals in Infection Control and Epidemiology, Inc; and book royalties for authoring *Safe Patients, Smart Hospitals: How One Doctor's Checklist Can Help Us Change Health Care From the Inside Out*. Dr Goeschel receives honoraria from hospitals, health care affiliates, and government agencies to speak on topics related to quality and patient safety. She has received contractual support from England's National Patient Safety Agency and from the World Health Organization and is formally a Senior Advisor to the WHO Patient Safety Programme. She currently receives contractual funding from the US Agency for Healthcare Research and Quality to reduce infections in hospitals across the United States, to improve cardiac surgical care, and to participate in a systematic review of quality and patient safety literature. Any conflicts of interest were resolved during the peer-review process. None of the other authors disclosed any current or foreseeable financial or personal relationships that may cause a conflict relative to the content of this submission. The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Ms. Aswani is supported by a Lister Hill Health Policy Fellowship from the University of Alabama at Birmingham School of Public Health; there is no other support for this manuscript.

Corresponding Author:
Monica S. Aswani, MSPH, The Johns Hopkins School of Medicine, Anesthesia and Critical Care Medicine, 1909 Thames Street 1st Floor, Baltimore, MD 21231
Email: maswani1@jhmi.edu

Furthermore, teams sustained these reduced CLABSI rates an additional 18 months after the initial 18-month period.[4] Others have achieved similar results in regional and pediatric settings.[5,6]

The US House of Representatives Committee on Oversight and Government Reform, compelled by the possibility of reducing the costs of health care while improving quality, conducted a survey of state hospital associations to assess hospital activities to prevent HAIs.[7] All 50 states reported efforts to reduce HAIs, and a large majority identified CLABSI reduction as a top priority.[8] Yet consumers often lack information regarding CLABSI rates, and hospital-level public reporting of HAIs varies widely.[9] CLABSIs are perhaps the best HAI candidate for public reporting because the Centers for Disease Control and Prevention (CDC) CLABSI definitions are well established, monitoring mechanisms exist through the National Healthcare Safety Network (NHSN), and inexpensive interventions can virtually eliminate these infections.[10] Despite this, the quality, amount, and format of HAI and CLABSI information presented by states vary widely.

Without mechanisms to ensure that publicly reported quality measures are standardized and accurate, there is potential to misinform key stakeholders in health care.[11] In this article, we describe details regarding state efforts to publicly report CLABSIs and discuss the need for standardized data definitions, data collection methods, and data reporting requirements.

Methods

Data Collection

We limited the data analysis to CLABSIs because these measures are well defined and mature when compared with other HAIs.

The laws, administrative regulations, and state plans of 50 US states and 1 US territory (District of Columbia) were reviewed by one of the authors (JR) to determine if the state provides for CLABSI monitoring, whether the law is mandatory or voluntary, the data collection entity used for reporting HAI data, if public release of data is required, the public reporting mechanism, and scheduling for such public reporting.[12] JR conducted a search of relevant HAI keywords in the Lexis-Nexis legal research database to find state HAI-related statutory laws, found HAI regulations on state administrative regulation databases, and located state plans to address HAIs on the CDC Web site.[13]

We accessed Department of Health Web sites for published reports on HAIs and CLABSIs. If a report was not found by following indicators such as health care quality, data, and/or statistical reports, one of the authors (MA) conducted a page search for the following terms: *CLABSI*, *CLA-BSI*, *BSI*, *bloodstream infection*, *HAI*, *health care associated infection*, *hospital acquired infection*, *nosocomial infection*, and *mandatory reporting*. We accessed all online data in June 2010.

Data Analysis

After locating each state's laws, HAI plans, and CLABSI or HAI report if available, we abstracted information relevant to 5 key areas: monitoring/reporting practices and public disclosure mechanisms, CLABSI rate data, risk adjustment, location/care setting, and report logistics. For each of these domains, we considered the following questions.

Monitoring and reporting practice. Do states require mandatory or voluntary CLABSI monitoring? If so, do they report to the NHSN or another data collection entity? States that do not report to NHSN may report to a state agency or state contracted entity responsible for administering the state's HAI program. What are the mandated public disclosure methods and release schedules of each state?

CLABSI rate. Did states present CLABSI infections as a rate per 1000 central line days so that inter- and intra-institution comparisons are possible? Does the state use standardized definitions developed by the CDC for NHSN?

Risk adjustment. What methods, if any, are used to risk adjust CLABSI rates? Reported CLABSI data can be risk adjusted by location. Two risk-adjustment methods are common. The first, standardized infection ratio (SIR), is the observed number of infections divided by the expected number of infections. The "expected" is based on historical NHSN CLABSI data.[14] The second, device utilization ratio (DUR), is a proportion of device-days to patient-days.[15] The denominator helps control for variation in the average length of stay by location.[16] Studies have shown that device exposure varies by ICU type and correlates to an increased risk of HAIs.[16,17]

Location/unit setting. In what locations or care settings are CLABSI monitored? Are CLABSI data collected throughout the entire facility or in specific areas? Do states report by unit type only, by hospital/nonunit, or by hospital-specific unit? Unit type only indicates that the state aggregated CLABSI data by similar unit types (eg, surgical ICU) across the state. Hospital/nonunit indicates that the report presents CLABSI information by hospital, but not broken down by specific unit settings within each hospital. Hospital-specific unit signifies unit types within each hospital that reported data.

At the unit level, states can summarize information by critical care, inpatient, and/or specialty care. Evidence about CLABSI rates by specialty provider type is limited, but the literature suggests that long-term acute care hospitals may harbor increased CLABSI risk.[18,19]

Report logistics. We looked at the period of available data for each report, the time lag in reporting, and the total period of available data by state.

Table 1. CLABSI Reporting Methods

State	CLABSI Rate[a]	Standardized Infection Ratio[b]	Device Utilization Ratio[c]
Colorado	✓		
Connecticut	✓		✓
Delaware	✓		✓
Illinois		✓	
Maine	✓		
Massachusetts	✓	✓	✓
Missouri	✓		
New York	✓		
Oregon	✓		
Pennsylvania	✓	✓	✓
South Carolina		✓	
Tennessee	✓	✓	
Virginia	✓		
Washington	✓		
Summary	Yes = 86% No = 14%	Yes = 36% No = 64%	Yes = 29% No = 71%

Abbreviation: CLABSI, central line–associated bloodstream infection.
[a]CLABSI rate: number of infections per 1000 central line days.
[b]Standardized infection ratio: observed number of infections divided by expected number of infections.
[c]Device utilization ratio: device days to patient days.

Results

State laws mandate CLABSI monitoring in 28 (55%) of the 50 states and 1 US territory we surveyed. Three states (6%) have laws that codify a voluntary reporting process. As of June 2010, we found no laws related to CLABSI monitoring for the remaining 20 states (39%) (see Appendix).

Of the 28 states that mandate CLABSI monitoring, 24 (86%) require hospitals to submit data to NHSN by law. Three states (11%) require submission to a state agency, and 1 state, Montana (4%), requires reporting to a state entity. Per the statute, a state agency is responsible for administering the HAI program, whereas a state entity is a state-contracted system responsible for administering the HAI program. Public data reports are required in 26 (93%) of the 28 states with mandatory HAI laws, yet only 14 (50%) of the 28 states had public reports available online through their Department of Health Web sites.

Of the 3 states with voluntary legislation, 2 (67%) require hospitals to submit data to NHSN and 1 (33%) requires data submission to a state agency. Public data reports are required in 2 (67%) of the 3 states that have voluntary HAI laws.

The 15 states with publicly available CLABSI data (14 mandated states and 1 voluntary state) vary in how they report infection data. New Mexico, a state with voluntary monitoring legislation, posted a single state CLABSI rate. We did not include it in the tables because it represents data from a small beta of their public reporting process. The following results reflect data from 14 states, all with mandatory CLABSI monitoring laws.

Twelve states (86%) publish infections as a rate per 1000 central line days. The 2 states (14%) that do not, Illinois and South Carolina, reported number of infections and central line days, but did not calculate a rate per 1000 central line days. Five states (36%) adjusted infection rates by SIRs, and 4 states (29%) risk adjusted through DURs (Table 1).

States also vary widely in how they report CLABSI data for public consumption. Seven states (50%) aggregated and reported CLABSI data by unit type only (eg, CLABSIs aggregated and reported as a single rate for all surgical ICUs across the state). Five states (36%) presented CLABSI rates by hospital without stratifying infections by unit settings within each hospital. Nine states (64%) stratified CLABSIs by hospital-specific units, delineating CLABSI rates for each ICU type within each hospital. Five states (36%), Massachusetts, Missouri, New York, Oregon, and Pennsylvania, presented data using 2 of these 3 approaches, such as unit type and hospital-specific unit type. Only 1 state (7%), Tennessee, presented data in all 3 formats (Table 2).

Reports typically organize unit-level CLABSI rates into 3 overarching categories: critical care, inpatient, and/or specialty care. The most common critical care unit types reported were medical (86%), medical/surgical (71%), and surgical (64%; Table 3). Three states (21%) reported CLABSIs by noncritical care inpatient and/or specialty care units (data not shown). Pennsylvania reported CLABSIs for 10 inpatient units and 1 specialty care unit. South Carolina pooled all inpatient units together except for inpatient rehabilitation and inpatient long-term care, and Washington reported infection data for inpatient long-term care.

Two states (14%), Colorado and South Carolina, reported CLABSI in long-term acute care hospitals. This is separate from CLABSI data reported by Pennsylvania and Washington for inpatient long-term care units.

We analyzed the total period of available data by state, using their most recent reports to gauge the length and time lag of data collection. The most common time frame represented by the reports was 1 year (10 states, 71%). The average time lag between collection and publication was 6 months, with a range of 2 to 11 months (Table 4).

Discussion

The increasing demand for value-based purchasing and pay for performance necessitate measuring and reporting data that are standardized, accurate, and accessible.[11,20] CLABSI measures are among the most mature and, as such, could inform how health care monitors, publicly

Table 2. Summary of CLABSI Infection Data by Location

State	Unit Type Only[a]	Hospital/ Nonunit[b]	Hospital-Specific Unit[c]	Long-Term Acute Care Hospital
Colorado			✓	✓
Connecticut	✓			
Delaware			✓	
Illinois			✓	
Maine		✓		
Massachusetts	✓		✓	
Missouri	✓		✓	
New York	✓		✓	
Oregon	✓	✓		
Pennsylvania	✓	✓		
South Carolina			✓	✓
Tennessee	✓	✓	✓	
Virginia		✓		
Washington			✓	
Summary	Yes = 50% No = 50%	Yes = 36% No = 64%	Yes = 64% No = 36%	Yes = 14% No = 86%

Abbreviation: CLABSI, central line–associated bloodstream infection.
[a]Unit type: CLABSIs aggregated by unit type (eg, surgical intensive care unit) across state.
[b]Hospital/nonunit: CLABSIs tallied by hospital, but not units within each hospital.
[c]Hospital-specific units: CLABSIs tallied by unit types within each hospital.

Table 3. Summary of CLABSI Infection Data by Unit Setting: Critical Care Units[a]

Critical Care Units	CO	CT	DE	IL	ME	MA	MO	NY	OR	PA	SC	TN	VA	WA	Total %
All adult ICUs pooled					✓								✓		14
Burn						✓				✓				✓	21
Coronary								✓				✓		✓	21
Medical cardiac	✓					✓									14
Medical major teaching															0
Medical all others	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	86
Medical/surgical major teaching						✓		✓				✓			21
Medical/surgical all others	✓	✓	✓	✓				✓	✓	✓	✓	✓		✓	71
Neurologic								✓							7
Neurosurgical						✓						✓		✓	21
Pediatric cardiothoracic						✓								✓	14
Pediatric medical		✓				✓		✓		✓	✓	✓			43
Pediatric medical/surgical			✓			✓					✓			✓	29
Surgical	✓			✓		✓	✓	✓	✓	✓	✓	✓			64
Surgical cardiothoracic	✓					✓		✓		✓		✓		✓	43
Trauma						✓				✓				✓	21

Abbreviations: CLABSI, central line–associated bloodstream infection; ICU, intensive care unit.
[a]Data collected during June 2010. Check signifies CLABSI data for critical care unit type were presented, by unit type only, hospital-specific unit type, or combined with other known unit types into an aggregate number (see Table 1). "All adult ICUs pooled" indicates no specific delineation of unit types in the summary rate. No check signifies CLABSI data not presented.

reports, and accounts for patient outcomes. This report characterizes the continuing efforts of states to monitor and report CLABSI data. While most states endorse reducing CLABSI as a priority,[8] only 28 states (55%) mandate CLABSI monitoring, and only 14 (50%) of those 28 mandated states had CLABSI data publicly available on their state health department Web sites during our June 2010 study.

The methods used to monitor and report infections varied widely among the states. We identified significant variation in the presentation of infection rates, methods of risk adjustment, locations and care settings reported, time span of data

Table 4. Length of Data Collection and Time to Publish

State	Last Report Date	Last Report Time Frame	Last Report Time Length	Time Lag to Public Report (Months)
Colorado	1/15/10	August 2008 to July 2009	Year	6.5
Connecticut	10/1/09	July 2008 to June 2009	Year	3
Delaware	6/1/10	January to March 2010	3 Months	2
Illinois	N/A	January to December 2009	Year	N/A
Maine	1/31/2010	January 2008 to June 2009	1.5 Years	7
Massachusetts	4/1/2010	July 2008 to June 2009	Year	9
Missouri	12/1/2009	April 2008 to March 2009	Year	8
New York	5/1/2009	January to December 2008	Year	4
Oregon	5/24/2010	January to December 2009	Year	4.75
Pennsylvania	12/1/2009	July to December 2008	6 Months	11
South Carolina	2/1/2010	December 2008 to November 2009	Year	2
Tennessee	12/1/2009	January to December 2008	Year	11
Virginia	12/4/2009	July to September 2009	3 Months	2.25
Washington	4/14/2010	January to December 2009	Year	4
Summary			Year and a half = 7% Year = 71% Half a year = 7% Quarter = 14%	Average = 5.73 months

collection, and time lag to reporting. As such, the available data present a confusing picture.

The lack of comparative data highlights the importance of standard approaches for the type, manner, and frequency of CLABSI measures reported. Unless all institutions provide the same quality and type of data, it is difficult for consumers, payers, or regulators to compare infections within or across states, potentially making inaccurate inferences about the quality of care.[11]

In addition to state efforts, we recognize that there are a growing number of national efforts to publicly report CLABSIs. These are likely not first choice options for consumers who wish to compare hospital performance. Nevertheless, they complicate the picture of CLABSIs even further and intensify our concern. The Agency for Healthcare Research and Quality (AHRQ) included aggregate CLABSI data in the 2010 National Healthcare Quality Report.[21] The AHRQ report used CLABSI rate as the metric of choice. The CDC released the first public CLABSI report in May 2010 based on NHSN data and a limited state cohort.[14] The CDC report used the SIR as the metric of choice. The Commonwealth Fund posted hospital-specific CLABSI data in July 2010, as part of their Why Not the Best? Web series. The report includes data for 936 hospitals in 44 states. Each of these adds momentum to CLABSI efforts, but not necessarily clarity to our understanding of whether we actually reduce CLABSIs in US hospitals.

Our study highlights the need for the federal government to set the rules for how hospitals define, monitor, and report CLABSIs. A step toward this goal is the newly enacted CMS rule that requires hospitals to report ICU CLABSI data, using NHSN definitions, as part of CMS Compare. By aligning payment policies to reward hospitals for reporting and reducing infections, and encouraging transparent public reporting of infections using valid data, the CMS efforts should provide valuable information to consumers and help the industry learn how to broadly improve outcomes.

Yet required use of the NHSN definitions and database and hospital payment tied to CMS Compare public reports are not sufficient to assure that hospitals prevent CLABSIs. Most important, there must be assurances that the data reported are valid. Although monitoring mechanisms through NHSN help streamline data entry and management, few mechanisms exist to ensure the accuracy of the data. Methods to mitigate bias coupled with an auditing system can help ensure that performance reports are accurate.[11]

Limitations

This study has several limitations. First, we searched only state health department Web sites, thus data may be publicly available that we did not consider (eg, on individual hospital Web sites). We recognize that not all publicly available CLABSI data are present in this article; however, a component of consumer-friendly data is easy access. Nevertheless, 15 states have publicly available data, and by virtue of frequency and formatting, they convey cause for concern. Second, we conducted our review during a single month, and there is no way to know what Web updates might be

forthcoming. Third, we did not validate the accuracy of the Web reporting. Yet the intent of making CLABSI data publicly available is to make consumers use them when selecting a provider or assessing improvement efforts within a hospital; thus, we assumed the data are accurate. Finally, the data are time sensitive and may change by the time the results of this study are available. As the demand for quality health care increases, states are constantly implementing new legislation to meet the demands of consumers. Nevertheless, the amount of data should only increase; thus, new reports will be clearly discernable.

Conclusions

Although HAI in general and CLABSI in specific have received tremendous attention from Congress, the public, and the media, only 15 states (29%) report CLABSIs on their state health department Web sites. Among those that do report, the methods of data collection and reporting, public disclosure requirements, and schedules for reporting vary widely. This limits the value of the reports for consumers, payers, and regulators.

We applaud the new CMS rule regarding CLABSI data collection, submission, public reporting, and influence on hospital payment. The potential to eradicate a preventable harm is real through these standardized efforts. Yet these policy provisions do not go far enough. We encourage CMS to build a rigorous process to validate CLABSI data using clinical records.

There are few health care harms for which we have the knowledge and experience to accurately measure and nearly eliminate. Yet CLABSIs—although common, costly, and often lethal—are also largely preventable. Hundreds of hospitals in states across the United States and in countries around the world have nearly eliminated these infections. Consumers who want to choose high-quality care have the right to know whether their local providers have invested the time and effort to reduce these infections. Only when CLABSI data are uniformly collected, reported, clinically validated, and made transparent will such a choice be possible. CLABSI can provide a model for monitoring and reducing other types of preventable harm.

Appendix

Summary of HAI Legislation by State

States Collecting CLABSI Data Under the Authority of a State Law or Administrative Regulation	Is the State Law or Regulation Mandatory (M) or Voluntary (V)?	Data Collection Entity	Does the HAI Law Require the Public Release of Data?	What Is the Public Reporting Mechanism?	Date of First Required Public Reporting as Specified in the Law	Does the State Currently Have Publicly Released Data Available Online?
AL	M	NHSN	Yes	Annual report to be produced electronically or in hard copy	Not specified	No
AK[a]	V	State agency	No	None specified	Not specified	No
AR	V[b]	NHSN	Yes	Annual report submitted to legislature and published on state agency Web site	1/1/2010	No
CA	M	NHSN	Yes	Annual report provided to the governor, legislature, and posted on state agency Web site	1/1/2011	No
CO	M	NHSN	Yes	Annual report submitted to legislature and posted on state agency Web site. Semiannual information bulletins are also required.	1/15/2008	Yes
CT	M	NHSN	Yes	Annual report submitted to legislature, published on state agency Web site, and made available to the public	10/1/2008	Yes
DE	M	NHSN	Yes	Initial annual report to legislature and published on state agency Web site; quarterly updates thereafter	6/30/2009	Yes
IL	M	State agency	Yes	Annual report submitted to legislature and posted on state agency Web site	Not specified	Yes
ME	M	NHSN	Yes	Annual report published on state Web site and available on request	Not specified	Yes
MD	M	NHSN	Yes	Annual report with no further specification	10//1/1995[c]	No
MA	M	NHSN	Yes	Publication on state Web site	Not specified	Yes
MN	M	State entity	Yes	Web-based system	1/1/2009[d]	Yes

(continued)

Appendix (continued)

States Collecting CLABSI Data Under the Authority of a State Law or Administrative Regulation	Is the State Law or Regulation Mandatory (M) or Voluntary (V)?	Data Collection Entity	Does the HAI Law Require the Public Release of Data?	What Is the Public Reporting Mechanism?	Date of First Required Public Reporting as Specified in the Law	Does the State Currently Have Publicly Released Data Available Online?
MO	M	NHSN[e]	Yes	Publication of annual consumer guide made available to the public	Not specified	Yes
NV	M	NHSN	No	Not specified	Not specified[f]	No
NH	M	NHSN	Yes	State agency statewide database	Not specified	No
NJ	M	NHSN	Yes	State agency Web site publication; inclusion of data in state hospital performance report	Not specified	No
NM	V	NHSN	Yes	As determined by HAI advisory committee	07/01/2011	Yes
NY	M	NHSN	Yes	Statewide database and annual report submitted to governor, legislature, and posted on state agency Web site	May 1 of each year	Yes
OH	M	NHSN	Yes	Publication on state agency Web site	Not specified	No
OK	M	NHSN	Yes	Annual report	Not specified	No
OR	M	NHSN	Yes	Published rates biannually starting January 2010; quarterly beginning in January 2011; annual report also required	1/2010; thereafter April of each year	Yes
PA	M	NHSN	Yes	Annual report to legislature, posted on state agency Web site, and available for public inspection	5/1/2003[g]	Yes
RI	M	State Agency[h]	Yes	Annual report to legislature and published on state agency Web site	Dec-2010	Yes
SC	M	NHSN	Yes	Annual report to legislature and published on state agency Web site	2/1/2009	Yes
TN	M	NHSN	Yes	Annual report published on state agency Web site; consumer database	6-8 months following submission of facility reports	Yes
TX	M	NHSN	Yes	Annual report published on state agency Web site and other publicly accessible formats	Not specified[i]	No
UT	M	State agency	No	None specified	Not specified	No
VT	M	NHSN	Yes	Publication of hospital submitted reports on state agency Web site	Not specified	Yes
VA	M	NHSN	Yes	Hospital submitted data may be released to the public on request	Not specified	Yes
WA	M	NHSN	Yes	Annual report on state agency Web site	12/1/2009	Yes
WV	M	NHSN	Yes	Annual report to legislature; other public availability as determined by HAI advisory committee	1/15/2011	No

Abbreviations: CLABSI, central line–associated bloodstream infection; HAI, health care–associated infection; NHSN, National Healthcare Safety Network.
[a]Collection of data is authorized under a state reportable infectious disease administrative rule.
[b]Law requires mandatory CLABSI monitoring by facilities; however, submission of the collected data to the state agency is voluntary.
[c]Public reporting requirements made pre-HAI reporting requirements. CLABSI public reporting to begin in 2010.
[d]CLABSI reporting began in November 2009.
[e]Facilities also have the alternative option of reporting to the state agency.
[f]Data collection using NHSN is scheduled to begin June 1, 2010.
[g]Although Pennsylvania's statute specifically states public reporting is to occur "no later than May 1, 2003," amendments to the law requiring CLABSI and other HAI reporting to NHSN were not enacted until 2007 with the passage of the Pennsylvania Healthcare-Associated Infection Act, also known as Act 52.
[h]Some hospitals are reporting to NHSN; not expanded statewide because of funding issues.
[i]CLABSI monitoring not scheduled to begin until January 1, 2011.

Declaration of Conflicting Interests

The authors declared a potential conflict of interest (eg, a financial relationship with the commercial organizations or products discussed in this article) as follows: Dr Reagan reports receiving funding as a consultant from the New Mexico Medical Review Association based on stimulus ARRA funding provided to the state of New Mexico. Dr Pronovost reports receiving grants or contract support from the Agency for Healthcare Research and Quality, the National Institutes of Health, the National Patient Safety Agency (UK), the Robert Wood Johnson Foundation, and The Commonwealth Fund for research related to measuring and improving patient safety; honoraria from various hospitals and health systems and the Leigh Speakers Bureau to speak on quality and safety; consultancy with the Association for Professionals in Infection Control and Epidemiology, Inc; and book royalties for authoring *Safe Patients, Smart Hospitals: How One Doctor's Checklist Can Help Us Change Health Care From the Inside Out*. Dr Goeschel receives honoraria from hospitals, health care affiliates, and government agencies to speak on topics related to quality and patient safety. She has received contractual support from England's National Patient Safety Agency and from the World Health Organization and is formally a Senior Advisor to the WHO Patient Safety Programme. She currently receives contractual funding from the US Agency for Healthcare Research and Quality to reduce infections in hospitals across the United States, to improve cardiac surgical care, and to participate in a systematic review of quality and patient safety literature. Any conflicts of interest were resolved during the peer-review process. None of the other authors disclosed any current or foreseeable financial or personal relationships that may cause a conflict relative to the content of this submission.

Funding

The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Ms. Aswani is supported by a Lister Hill Health Policy Fellowship from the University of Alabama at Birmingham School of Public Health; there is no other support for this manuscript.

References

1. Klevens RM, Edwards JR, Richards CL Jr, et al. Estimating health care-associated infections and deaths in U.S. hospitals, 2002. *Public Health Rep*. 2007;122:160-166.
2. Scott RD II. The direct medical costs of healthcare-associated infections in U.S. hospitals and the benefits of prevention. http://www.cdc.gov/ncidod/dhqp/pdf/Scott_CostPaper.pdf. Accessed July 1, 2010.
3. Pronovost P, Needham D, Berenholtz S, et al. An intervention to decrease catheter-related bloodstream infections in the ICU. *N Engl J Med*. 2006;355:2725-2732.
4. Pronovost PJ, Goeschel CA, Colantuoni E, et al. Sustaining reductions in catheter related bloodstream infections in Michigan intensive care units: observational study. *BMJ*. 2010;340:c309.
5. Shannon RP, Frndak D, Grunden N, et al. Using real-time problem solving to eliminate central line infections. *Jt Comm J Qual Patient Saf*. 2006;32:479-487.
6. McKee C, Berkowitz I, Cosgrove SE, et al. Reduction of catheter-associated bloodstream infections in pediatric patients: experimentation and reality. *Pediatr Crit Care Med*. 2008;9:40-46.
7. Waxman HA, Davis T. Survey of state hospital associations: practices to prevent hospital-associated bloodstream infections. http://oversight.house.gov/index.php?option=com_content&view=article&id=3612:survey-of-state-hospital-associations-practices-to-prevent-hospital-associated-bloodstream-infections&catid=43:investigations. Accessed July 10, 2010.
8. Murphy DJ, Needham DM, Goeschel C, Fan E, Cosgrove SE, Pronovost PJ. Monitoring and reducing central line-associated bloodstream infections: a national survey of state hospital associations. *Am J Med Qual*. 2010;25:255-260.
9. Marshall MN, Shekelle PG, Leatherman S, Brook RH. Public disclosure of performance data: learning from the US experience. *Qual Health Care*. 2000;9:53-57.
10. Edwards JR, Peterson KD, Mu Y, et al. National Healthcare Safety Network (NHSN) report: data summary for 2006 through 2008, issued December 2009. *Am J Infect Control*. 2009;37:783-805.
11. Pronovost PJ, Miller M, Wachter RM. The GAAP in quality measurement and reporting. *JAMA*. 2007;298:1800-1802.
12. Reagan JK. *The Movement Toward Patient Safety: State Action Related to Reporting and Disclosure of Healthcare-Associated Infections* [dissertation]. Houston, TX: University of Texas; 2010.
13. Centers for Disease Control and Prevention. State plans to address healthcare-associated infections. http://www.cdc.gov/HAI/HAIstatePlans.html. Accessed August 2, 2010.
14. Centers for Disease Control and Prevention. First state-specific healthcare-associated infections summary data report. http://www.cdc.gov/hai/pdfs/stateplans/SIR_05_25_2010.pdf. Accessed July 10, 2010.
15. Edwards JR, Peterson KD, Andrus ML, et al. National Healthcare Safety Network (NHSN) Report, data summary for 2006, issued June 2007. *Am J Infect Control*. 2007;35:290-301.
16. Jarvis WR, Edwards JR, Culver DH, et al. Nosocomial infection rates in adult and pediatric intensive care units in the United States. National Nosocomial Infections Surveillance System. *Am J Med*. 1991;91:185S-191S.

17. Wenzel RP, Osterman CA, Donowitz LG, et al. Identification of procedure-related nosocomial infections in high-risk patients. *Rev Infect Dis*. 1981;3:701-707.
18. Gould CV, Rothenberg R, Steinberg JP. Antibiotic resistance in long-term acute care hospitals: the perfect storm. *Infect Control Hosp Epidemiol*. 2006;27:920-925.
19. Wolfenden LL, Anderson G, Veledar E, Srinivasan A. Catheter-associated bloodstream infections in 2 long-term acute care hospitals. *Infect Control Hosp Epidemiol*. 2007; 28:105-106.
20. Salber PR, Bradley BE. Adding quality to the health care purchasing equation. *Health Aff (Millwood)*. 2001;Suppl Web Exclusives:W93-W95.
21. Agency for Healthcare Quality and Research. 2009 National Healthcare Quality Report. http://www.ahrq.gov/qual/nhqr09/nhqr09.pdf. Accessed July 2, 2010.